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Excercise: Lab Work 2

```
%qno 1
A=rand(20)
```

```
A = 20×20
    0.1582    0.2496    0.9039    0.9151    0.3242    0.3839    0.5569    0.1567 ···
    0.0621    0.3871    0.4522    0.9010    0.6690    0.6507    0.2739    0.0581
    0.7018    0.4210    0.0707    0.2142    0.2963    0.8174    0.1321    0.3397
    0.0865    0.6401    0.2413    0.5471    0.9300    0.7663    0.6997    0.8172
    0.6168    0.7876    0.7319    0.7847    0.2820    0.3742    0.4859    0.3775
    0.1738    0.2700    0.0405    0.1944    0.1689    0.1899    0.1827    0.9726
    0.6514    0.8440    0.4245    0.7469    0.7452    0.6465    0.1012    0.6053
    0.4987    0.7405    0.5402    0.4756    0.4771    0.0036    0.2016    0.3382
    0.2845    0.8261    0.9538    0.5833    0.6534    0.2829    0.1347    0.9280
    0.8306    0.1822    0.2089    0.2605    0.9666    0.6386    0.3238    0.8984
    0.8184    0.0654    0.1163    0.0848    0.3130    0.5921    0.9505    0.8507
    0.9382    0.6104    0.6462    0.2981    0.0764    0.3253    0.5321    0.2568
    0.0003    0.7016    0.1084    0.9171    0.7914    0.9890    0.2477    0.2855
    0.6404    0.1116    0.9835    0.4705    0.3654    0.1232    0.4373    0.7799
    0.0074    0.0958    0.2483    0.2695    0.5851    0.7359    0.6691    0.7014
      ⋮
```

```
rank(A)
```

```
ans =
20
```

```
%Qno 2
A=randi(5,5)
```

```
A = 5×5
     3     2     1     3     1
     1     2     1     2     4
     3     5     3     2     1
     5     5     1     3     5
     4     2     2     2     3
```

```
B=randi(5,5)
```

```
B = 5×5
     2     1     4     5     1
     4     4     5     5     3
     4     5     2     3     4
     1     3     5     3     4
     1     1     2     5     2
```

```
%qno 2 a
rank(A)
```

```
ans =
5
```

```
%Qno 2 b
rank(B)
```

```
ans =
5
```

```
%qno 2 c
rank(A+B)
```

```
ans =
5
```

```
%qno 2 d
rank(A-B)
```

```
ans =
5
```

```
%qno 2 e
rank(A*B)
```

```
ans =
5
```

```
%qno 2 f
k=randi(10)
```

```
k =
1
```

```
Z=k*B
```

```
Z = 5×5
     2     1     4     5     1
     4     4     5     5     3
     4     5     2     3     4
     1     3     5     3     4
     1     1     2     5     2
```

```
rank(Z)
```

```
ans =
5
```

```
%Qno 3
Y=randi(5,5)
```

```
Y = 5×5
     1     2     3     4     5
     4     1     2     3     3
     5     2     1     1     3
     2     3     1     4     2
     5     4     1     1     4
```

```
Z=randi(5,5)
```

```
Z = 5×5
     3     3     4     3     1
     3     5     2     3     5
     3     3     4     3     5
     4     4     4     5     3
     1     2     5     1     5
```

```
X=inv(Y)*Z
```

```
X = 5×5
    0.1212    0.7273   -0.1212    0.0909    1.2424
   -4.0303   -0.1818   -1.9697   -4.2727    0.9394
  -11.5455    0.7273   -8.4545  -12.9091    2.9091
    3.8182    0.9091    2.1818    4.3636   -0.3636
    6.0606   -0.6364    4.9394    6.5455   -1.8788
```

```
%Qno 4 a
A=[1,1,-1;3,-2,9;7,-3,17]
```

```
A = 3×3
     1     1    -1
     3    -2     9
     7    -3    17
```

```
if (rank(A)==size(A,2))
    disp('Trivial solution')
elseif (rank(A)==size(A,2)-1)
    disp('Non trivial solution, it represents a straight line')
elseif (rank(A)==size(A,2)-2)
    disp('Non trivial solution, it represents a plane')
end
```

```
Non trivial solution, it represents a straight line
```

```
%Qno 4 b
A=[2,3,5,-8,1;-1,1,5,2,3;5,9,-2,1,3;2,3,-5,8,-1;6,-3,-7,2,-1]
```

```
A = 5×5
     2     3     5    -8     1
    -1     1     5     2     3
     5     9    -2     1     3
     2     3    -5     8    -1
     6    -3    -7     2    -1
```

```
if (rank(A)==size(A,2))
    disp('Trivial solution')
elseif (rank(A)==size(A,2)-1)
    disp('Non trivial solution, it represents a straight line')
elseif (rank(A)==size(A,2)-2)
    disp('Non trivial solution, it represents a plane')
end
```

```
Trivial solution
```

```
%Qno 4 c
A=[1,-3,5,1;3,1,2,4;4,-2,7,5;2,-6,10,2]
```

```
A = 4×4
     1    -3     5     1
     3     1     2     4
     4    -2     7     5
     2    -6    10     2
```

```
if (rank(A)==size(A,2))
    disp('Trivial solution')
elseif (rank(A)==size(A,2)-1)
    disp('Non trivial solution, it represents a straight line')
elseif (rank(A)==size(A,2)-2)
    disp('Non trivial solution, it represents a plane')
end
```

```
Non trivial solution, it represents a plane
```

```
%Qno 5
A=randi([0,9],5,4)*randi([0,9],4,5)
```

```
A = 5×5
   134   128    14    72    38
   112    85    45    52    43
   146   103    58    85    52
    88    57    58    27    42
    88    60    43    42    36
```

```
rank(A)
```

```
ans =
4
```

```
%Qno 5 a
y=A(3,5)
```

```
y =
52
```

```
%Qno 5 b
b=A(1,:)
```

```
b = 1×5
   134   128    14    72    38
```

```
%Qno 5 c
C=A([1,3],:)
```

```
C = 2×5
   134   128    14    72    38
   146   103    58    85    52
```

```
%  Note that 'end' is a built-in reserved word in Matlab
```

```
%qno 5 d
b=A(:,2)
```

```
b = 5×1
   128
    85
   103
    57
    60
```

```
%Qno 5 e
C=A(:,[2,4])
```

```
C = 5×2
   128    72
    85    52
   103    85
    57    27
    60    42
```

```
%Qno 6
A=randi([0,9],9,2)*randi([0,9],2,9)
```

```
A = 9×9
   104    38    43    37    35   128    42    31    68
    20     8     7     7     5    26     6     7    14
    42    21     7    14     0    63     0    21    35
    38    17    10    13     5    53     6    16    29
    38    17    10    13     5    53     6    16    29
    50    23    12    17     5    71     6    22    39
   114    39    52    41    45   135    54    30    71
    70    31    19    24    10    97    12    29    53
    78    21    46    29    45    81    54    12    41
```

```
rank(A)
```

```
ans =
2
```

```
B=A+A'
```

```
B = 9×9
   208    58    85    75    73   178   156   101   146
    58    16    28    24    22    49    45    38    35
    85    28    14    24    10    75    52    40    81
    75    24    24    26    18    70    47    40    58
    73    22    10    18    10    58    51    26    74
   178    49    75    70    58   142   141   119   120
   156    45    52    47    51   141   108    42   125
   101    38    40    40    26   119    42    58    65
   146    35    81    58    74   120   125    65    82
```

```
rank(B)
```

```
ans =
4
```

```
%Qno 7
A=randi([0,9],10,3)*randi([0,9],3,5)
```

```
A = 10×5
    49    69    56    71    20
    44    23    15    39     0
    24    48    41    44    15
    24    32    20    32    20
    16    62    46    46    40
    26    38    29    38    15
    63    97    74    95    40
    13    44    34    34    25
    42    33    27    45     0
    40    65    59    65    10
```

```
rank(A)
```

```
ans =
3
```

```
%Qno 7 a
S1=A*A'
```

```
S1 = 10×10
       15739        7352       10208        7176       11704        8518 ···
        7352        4211        4491        3340        4614        3935
       10208        4491        6722        4640        7870        5534
        7176        3340        4640        3424        5560        3936
       11704        4614        7870        5560        9932        6454
        8518        3935        5534        3936        6454        4630
       21469        9818       13982        9936       16396       11680
        8491        3420        5689        3988        7064        4663
        9042        4767        5679        4044        6030        4839
       14564        6675        9509        6500       10774        7841
```

```
S2=A'*A
```

```
S2 = 5×5
       13923       18962       14956       19660        6095
       18962       30565       24171       29649       11420
       14956       24171       19241       23459        8810
       19660       29649       23459       29513       10430
        6095       11420        8810       10430        5175
```

```
%Qno 7 b
rank(S1)
```

```
ans =
3
```

```
rank(S2)
```

```
ans =
3
```

```
%Qno 8 a
A = [3,3,-1;3,-8,6;1,1,10];
B = [4;7;22];
augmented=[A B]
```

```
augmented = 3×4
     3     3    -1     4
     3    -8     6     7
     1     1    10    22
```

```
rref(augmented)
```

```
ans = 3×4
     1     0     0     1
     0     1     0     1
     0     0     1     2
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a straight line
```

```
%Qno 8 b
A=[4,-3,2,5;9,-2,-3,6;2,11,3,-6;8,-3,5,-1];
B=[10;7;13;14];
augmented=[A B]
```

```
augmented = 4×5
     4    -3     2     5    10
     9    -2    -3     6     7
     2    11     3    -6    13
     8    -3     5    -1    14
```

```
rref(augmented)
```

```
ans = 4×5
     1     0     0     0     1
     0     1     0     0     1
     0     0     1     0     2
     0     0     0     1     1
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
```

```
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a straight line
```

```
%Qno 8 c
A=[1,-3,2,5;2,-2,3,6;2,11,-3,-6;5,6,2,5];
B=[3;11;40;54];
augmented=[A B]
```

```
augmented = 4×5
     1    -3     2     5     3
     2    -2     3     6    11
     2    11    -3    -6    40
     5     6     2     5    54
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0         0    2.4545   12.5455
         0    1.0000         0   -1.0909    0.0909
         0         0    1.0000   -0.3636   -4.6364
         0         0         0         0         0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a plane
```

```
%Qno 8 d
A=[4,-3,2,5;9,-2,-3,6;5,1,-5,1;8,-6,4,10];
B=[10;7;13;20];
augmented=[A B]
```

```
augmented = 4×5
     4    -3     2     5    10
     9    -2    -3     6     7
     5     1    -5     1    13
     8    -6     4    10    20
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0   -0.6842    0.4211         0
         0    1.0000   -1.5789   -1.1053         0
         0         0         0         0    1.0000
         0         0         0         0         0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a plane
```

```
%Qno 8 e
A=[1,1,-1;2,-2,3;3,2,-5];
B=[7;9;10];
augmented=[A B]
```

```
augmented = 3×4
     1     1    -1     7
     2    -2     3     9
     3     2    -5    10
```

```
rref(augmented)
```

```
ans = 3×4
     1     0     0     5
     0     1     0     5
     0     0     1     3
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a straight line
```

```
%Qno 8 f
A=[1,-3,2,5;2,-2,3,6;2,11,-3,-6;5,6,2,5];
B=[0;0;0;0];
augmented=[A B]
```

```
augmented = 4×5
     1    -3     2     5     0
     2    -2     3     6     0
     2    11    -3    -6     0
     5     6     2     5     0
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0         0    2.4545         0
         0    1.0000         0   -1.0909         0
         0         0    1.0000   -0.3636         0
         0         0         0         0         0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a plane
```

```
%Qno 8 g
A=[4,-3,2,5;9,-2,-3,6;5,1,-5,1;8,-6,4,10];
B=[0;0;0;0];
augmented=[A B]
```

```
augmented = 4×5
     4    -3     2     5     0
     9    -2    -3     6     0
     5     1    -5     1     0
     8    -6     4    10     0
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0   -0.6842    0.4211         0
         0    1.0000   -1.5789   -1.1053         0
         0         0         0         0         0
         0         0         0         0         0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a hyperplane
```

```
%Qno 8 h
A=[1,1,-2;2,-3,1;3,-2,-1];
B=[0;0;0];
augmented=[A B]
```

```
augmented = 3×4
     1     1    -2     0
     2    -3     1     0
     3    -2    -1     0
```

```
rref(augmented)
```

```
ans = 3×4
     1     0    -1     0
     0     1    -1     0
     0     0     0     0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a plane
```

```
%Qno 8 i
A=[1,1,-5,3;2,-3,-10,4;1,-9,-5,1;4,-11,-20,8];
B=[0;0;0;0];
augmented=[A B]
```

```
augmented = 4×5
     1     1    -5     3     0
     2    -3   -10     4     0
     1    -9    -5     1     0
     4   -11   -20     8     0
```

```
rref(augmented)
```

```
ans = 4×5
     1     0    -5     0     0
     0     1     0     0     0
     0     0     0     1     0
     0     0     0     0     0
```

```
if (rank(augmented)==size(augmented,2))
    disp('This solution represents a point')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('This solution represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('This solution represents a plane')
    elseif (rank(augmented)==size(augmented,2)-3)
    disp('This solution represents a hyperplane')
end
```

```
This solution represents a plane
```

```
%qno 9 a
a=[3,3,-1;3,-8,6;1,1,10]
```

```
a = 3×3
     3     3    -1
     3    -8     6
     1     1    10
```

```
b=[4;7;22]
```

```
b = 3×1
     4
     7
    22
```

```
augmented=[a b]
```

```
augmented = 3×4
     3     3    -1     4
     3    -8     6     7
     1     1    10    22
```

```
rref(augmented)
```

```
ans = 3×4
     1     0     0     1
     0     1     0     1
     0     0     1     2
```

```
x=inv(a)*b
```

```
x = 3×1
    1.0000
    1.0000
    2.0000
```

```
if(rank(augmented)==size(augmented,2))
    disp('Unique solution')
elseif (rank(augmented)==size(augmented,2)-1)
    disp('infinitely many solutions and it represents a straight line')
elseif (rank(augmented)==size(augmented,2)-2)
    disp('infinitely many solutions and represents a plane')

end
```

```
infinitely many solutions and it represents a straight line
```

```
%qno 9 b
a=[4,-3,2,5;9,-2,-3,6;2,11,3,-6;8,-3,5,-1]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     2    11     3    -6
     8    -3     5    -1
```

```
b=[10;7;13;14]
```

```
b = 4×1
    10
     7
    13
    14
```

```
augmented=[a b]
```

```
augmented = 4×5
     4    -3     2     5    10
     9    -2    -3     6     7
     2    11     3    -6    13
     8    -3     5    -1    14
```

```
rref(augmented)
```

```
ans = 4×5
     1     0     0     0     1
     0     1     0     0     1
     0     0     1     0     2
     0     0     0     1     1
```

```
x=inv(a)*b
```

```
x = 4×1
    1.0000
    1.0000
    2.0000
    1.0000
```

```
if(rank(augmented)==size(augmented,2))
    disp('Unique solution')
elseif(rank(augmented)==size(augmented,2)-1)
    disp('infinitely many solutions and it represents a straight line')
elseif(rank(augmented)==size(augmented,2)-2)
    disp('infinitely many solutions and it represents a plane')
end
```

```
infinitely many solutions and it represents a straight line
```

```
%qno 9 c
a=[1,-3,2,5;2,-2,3,6;2,11,-3,-6;5,6,2,5]
```

```
a = 4×4
     1    -3     2     5
     2    -2     3     6
     2    11    -3    -6
     5     6     2     5
```

```
b=[3;11;40;54]
```

```
b = 4×1
     3
    11
    40
    54
```

```
augmented=[a b]
```

```
augmented = 4×5
     1    -3     2     5     3
     2    -2     3     6    11
     2    11    -3    -6    40
     5     6     2     5    54
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0         0    2.4545   12.5455
         0    1.0000         0   -1.0909    0.0909
         0         0    1.0000   -0.3636   -4.6364
         0         0         0         0         0
```

```
x=inv(a)*b
```

```
Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  3.340949e-18.
x = 4×1
   -64
    32
     0
     0
```

```
if(rank(augmented)==size(augmented,2))
    disp('Unique solution')
elseif(rank(augmented)==size(augmented,2)-1)
    disp('infinitely many solutions and it represents a straight line')
elseif(rank(augmented)==size(augmented,2)-2)
    disp('infinitely many solutions and it represents a plane')
end
```

```
infinitely many solutions and it represents a plane
```

```
%qno 9 d
a=[4,-3,2,5;9,-2,-3,6;5,1,-5,1;8,-6,4,10]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     5     1    -5     1
     8    -6     4    10
```

```
b=[10;7;13;20]
```

```
b = 4×1
    10
     7
    13
    20
```

```
augmented=[a b]
```

```
augmented = 4×5
     4    -3     2     5    10
     9    -2    -3     6     7
     5     1    -5     1    13
     8    -6     4    10    20
```

```
rref(augmented)
```

```
ans = 4×5
    1.0000         0   -0.6842    0.4211         0
         0    1.0000   -1.5789   -1.1053         0
         0         0         0         0    1.0000
         0         0         0         0         0
```

```
x=inv(a)*b
```

```
Warning: Matrix is singular to working precision.
x = 4×1
   I
   I
   I
   I
```

```
if(rank(augmented)==size(augmented,2))
    disp('Unique solution')
elseif(rank(augmented)==size(augmented,2)-1)
    disp('infinitely many solutions and it represents a straight line')
elseif(rank(augmented)==size(augmented,2)-2)
    disp('infinitely many solutions and it represents a plane')
```

```
infinitely many solutions and it represents a plane
```

```
end
```

```
%Qno 9 e
a=[1,1,-1;2,-2,3;3,2,-5]
```

```
a = 3×3
     1     1    -1
     2    -2     3
     3     2    -5
```

```
b=[7;9;10]
```

```
b = 3×1
     7
     9
    10
```

```
augmented=[a b]
```

```
augmented = 3×4
     1     1    -1     7
     2    -2     3     9
     3     2    -5    10
```

```
rref(augmented)
```

```
ans = 3×4
     1     0     0     5
     0     1     0     5
     0     0     1     3
```

```
x=inv(a)*b
```

```
x = 3×1
    5.0000
    5.0000
    3.0000
```

```
if(rank(augmented)==size(augmented,2))
    disp('Unique solution')
elseif(rank(augmented)==size(augmented,2)-1)
    disp('infinitely many solutions and it represents a straight line')
elseif(rank(augmented)==size(augmented,2)-2)
    disp('infinitely many solutions and it represents a plane')
end
```

```
infinitely many solutions and it represents a straight line
```

```
%qno 10 a
a=[3,3,-1;3,-8,6;1,1,10]
```

```
a = 3×3
     3     3    -1
     3    -8     6
     1     1    10
```

```
b=[4;7;22]
```

```
b = 3×1
     4
     7
    22
```

```
z=det(a)
```

```
z =
-341
```

```
if(det(a)==0)
    disp('the inverse of matrix a is not possible as determinant is 0 so it cannot
be solved')
else
    disp('the inverse of this matrix is possible so it can be solved')
      inverse=inv(a)
    x=a\b
end
```

```
the inverse of this matrix is possible so it can be solved
inverse = 3×3
    0.2522    0.0909   -0.0293
    0.0704   -0.0909    0.0616
   -0.0323         0    0.0968
x = 3×1
     1
     1
     2
```

```
%qno 10 b
a=[4,-3,2,5;9,-2,-3,6;2,11,3,-6;8,-3,5,-1]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     2    11     3    -6
     8    -3     5    -1
```

```
b=[10;7;13;14]
```

```
b = 4×1
    10
     7
    13
    14
```

```
z=det(a)
```

```
z =
-3753
```

```
if(det(a)==0)
    disp('the inverse of matrix a is not possible as determinant is 0 so it cannot
be solved')
else
    disp('the inverse of this matrix is possible so it can be solved')
      inverse=inv(a)
    x=a\b
end
```

```
the inverse of this matrix is possible so it can be solved
inverse = 4×4
   -0.0647    0.0791    0.0144    0.0647
    0.0791    0.0144    0.0935   -0.0791
    0.1953   -0.1194    0.0389    0.0269
    0.2212   -0.0069    0.0290   -0.1100
x = 4×1
    1.0000
    1.0000
    2.0000
    1.0000
```

```
%Qno 10 c
a=[1,-3,2,5;2,-2,3,6;2,11,-3,-6;5,6,2,5]
```

```
a = 4×4
     1    -3     2     5
     2    -2     3     6
     2    11    -3    -6
     5     6     2     5
```

```
b=[3;11;40;54]
```

```
b = 4×1
     3
    11
    40
```

```
    54
```

```
z=det(a)
```

```
z =
-3.9690e-15
```

```
if(det(a)==0)
    disp('the inverse of matrix a is not possible as determinant is 0 so it cannot
be solved')
else
    disp('the inverse of this matrix is possible so it can be solved')
       inverse=inv(a)
    x=a\b
end
```

```
the inverse of this matrix is possible so it can be solved
Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  3.340949e-18.
inverse = 4×4
1.0e+15 *
    6.8026    6.8026    6.8026   -6.8026
   -3.0234   -3.0234   -3.0234    3.0234
   -1.0078   -1.0078   -1.0078    1.0078
   -2.7714   -2.7714   -2.7714    2.7714
Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  3.340949e-18.
x = 4×1
   -4.0699
    7.4755
   -2.1748
    6.7692
```

```
%qnO 10 D
a=[4,-3,2,5;9,-2,-3,6;5,1,-5,1;8,-6,4,10]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     5     1    -5     1
     8    -6     4    10
```

```
b=[10;7;13;20]
```

```
b = 4×1
    10
     7
    13
    20
```

```
z=det(a)
```

```
z =
0
```

```
if(det(a)==0)
    disp('the inverse of matrix a is not possible as determinant is 0 so it cannot
be solved')
```

```
else
    disp('the inverse of this matrix is possible so it can be solved')
     inverse=inv(a)
    x=a\b
end
```

```
the inverse of matrix a is not possible as determinant is 0 so it cannot be solved
```

```
%qno 10 e
a=[1,1,-1;2,-2,3;3,2,-5]
```

```
a = 3×3
     1     1    -1
     2    -2     3
     3     2    -5
```

```
b=[7;9;10]
```

```
b = 3×1
     7
     9
    10
```

```
z=det(a)
```

```
z =
13.0000
```

```
if(det(a)==0)
    disp('the inverse of matrix a is not possible as determinant is 0 so it cannot
be solved')
else
    disp('the inverse of this matrix is possible so it can be solved')
     inverse=inv(a)
    x=a\b
end
```

```
the inverse of this matrix is possible so it can be solved
inverse = 3×3
    0.3077    0.2308    0.0769
    1.4615   -0.1538   -0.3846
    0.7692    0.0769   -0.3077
x = 3×1
    5.0000
    5.0000
    3.0000
```

```
%qno 11 a
a=[3,3,-1;3,-8,6;1,1,10]
```

```
a = 3×3
     3     3    -1
     3    -8     6
     1     1    10
```

```
b=[4;7;22]
```

```
b = 3×1
     4
     7
    22
```

```
x=inv(a)*b
```

```
x = 3×1
    1.0000
    1.0000
    2.0000
```

```
%qno 11 b
a=[4,-3,2,5;9,-2,-3,6;2,11,3,-6;8,-3,5,-1]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     2    11     3    -6
     8    -3     5    -1
```

```
b=[10;7;13;14]
```

```
b = 4×1
    10
     7
    13
    14
```

```
x=inv(a)*b
```

```
x = 4×1
    1.0000
    1.0000
    2.0000
    1.0000
```

```
%qno 11 c
a=[1,-3,2,5;2,-2,3,6;2,11,-3,-6;5,6,2,5]
```

```
a = 4×4
     1    -3     2     5
     2    -2     3     6
     2    11    -3    -6
     5     6     2     5
```

```
b=[3;11;40;54]
```

```
b = 4×1
     3
    11
    40
    54
```

```
x=inv(a)*b
```

```
Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  3.340949e-18.
x = 4×1
```

```
   -64
    32
     0
     0
```

```
%qno 11 d
a=[4,-3,2,5;9,-2,-3,6;5,1,-5,1;8,-6,4,10]
```

```
a = 4×4
     4    -3     2     5
     9    -2    -3     6
     5     1    -5     1
     8    -6     4    10
```

```
b=[10;7;13;20]
```

```
b = 4×1
    10
     7
    13
    20
```

```
x=inv(a)*b
```

```
Warning: Matrix is singular to working precision.
x = 4×1
   I
   I
   I
   I
```

```
%Qno 11 e
a=[1,1,-1;2,-2,3;3,2,-5]
```

```
a = 3×3
     1     1    -1
     2    -2     3
     3     2    -5
```

```
b=[7;9;10]
```

```
b = 3×1
     7
     9
    10
```

```
x=inv(a)*b
```

```
x = 3×1
    5.0000
    5.0000
    3.0000
```